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ABSTRACT

The Deductive-Nomological (D-N) model of human behavior is useful and provides the most objective explanation when it is appropriate but it is not necessarily an all-inclusive statement. For instance, explaining human behavior is always an act that entails languages and theories that are value laden and reveal human choices; however the D-N model does not indicate the possibility of alternative accounts and, a fortiori, provides no guidance in choosing among alternatives. Lately there has been increasing interest in humans and their behavior as that is manifested by virtue of humans acting in systems that are variously structure determined, chaotic, subject to constraints described by quantum mechanics, or evolutionary in development. The D-N model of explanation is the source of valid prediction and control when there is an appropriate level of process knowledge about events in question. Arguments used to claim that the deductive model of explanation is inappropriate in a specific situation often seem to confuse this claim with the distinction that can be made between explanations that are better or worse because they are less or more imperfect. Explanations in the human sciences seldom are of the determinate kind that permit rigorous prediction and control. Explanations in the human sciences making use of the D-N model are at best determinable rather than determinate aiming to go from imperfect laws to less imperfect laws. (ABL)

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EXPLAINING HUMAN BEHAVIOR

A Paper

Presented at the Annual Meeting

American Educational Research Association

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EXPLAINING HUMAN BEHAVIOR

In an apochryphal story:

> Willie Sutton (the famous bank robber) is supposed to have been asked 'Why do you rob banks?' His reply was 'That's where the money is.'

Was his reply an explanation? It wasn't for people who think that an explanation is an objective matter with public criteria for determining when an account is an explanation and when it isn't. In this story the force of the "explanation" is dependent on who is asking and what the context is for that asking. It is not an objective matter with public criteria.

The story does point out how multifaceted is the task of explaining human behavior. Willie Sutton had one view of explaining, the asking person probably had a different one and the reader of the story may have another. Some conjecturing about these viewpoints might be helpful in describing the various facets of explaining. First, Willie, without realizing it, could have been explaining his behavior as Hempel would have him do using the Deductive-Nomological (D-N) model:

> I always rob institutions that have money.
> Banks have money.
> ---
> I rob banks.

This classical and time-honored model of explanation would have suited Willie perfectly. The inquisitor, on the other hand, was probably initially dumbfounded by Willie's explanation. However, if the inquisitor had taken a view advocated by the phenomenologists then she would have initially understood Willie as a subject and not as an object after which Willie's "explanation" would have been seen as an explanation of a deductive kind. In retrospect, if the inquisitor had taken this view then it is even conceivable that she might have been able to predict Willie's reply to the question.

If these conjectures are "accurate" then the reader of the story will have some initial sense of the subtlety that is entailed by any efforts to explain human behavior. The D-N model is useful and provides the most objective explanation when it is appropriate but it is not necessarily the all-inclusive statement that we would like to make in explaining human behavior. For instance, explaining human behavior is always an act that entails languages and theories that are value-laden and reveal human choices; however, the D-N model does not indicate the possibility of alternative accounts and, a fortiori provides no guidance in choosing among alternatives.

In the past, explaining human behavior was generally thought to be similar to explaining in any other realm where regularities in behavior were observed. For Skinner, learning was all of one kind as one obvious example. Most people in the human sciences now believe that such an approach to explaining and understanding human behavior is too simplistic to be of theoretical or practical value. Of late, there has been increasing interest in humans and their behavior as that is manifested by virtue of humans acting in systems that are variously: (a) structure determined, (b) chaotic, (c) subject to constraints described by

quantum mechanics, (d) evolutionary in development, etc. Certainly there are other models of man that have not been mentioned but this list points to some of the difficulties that anyone trying to explain human behavior could expect to encounter. For instance, if man is part of a chaotic system then his behavior is not determined in the way that is required by the D-N model and yet his behavior is not strictly random. How is his behavior to be explained?

THE DEDUCTIVE MODEL OF EXPLANATION AND ITS APPLICABILITY

The deductive model requires that an explanation be a valid deduction of the explicandum from a true law statement and certain initial conditions. This section will not be a treatise on the deductive model of explaining but will be a defense of the use of this model in places where many people are now saying it is indefensible.

There is a range of arguments given for the rejection of the D-N model of explanation that relies on the differences that exist between the hard physical science fields and the fields of human science. For instance, there certainly is a vast difference between the events that involve inanimate objects and those that include the activities of humans. this difference is frequently cited as the reason for rejecting the D-N model of explanation. As an example, it can be said that human behavior is so complex that specifying the minor premisses for the D-N model is clearly impossible. From that the argument is made that a new approach is needed in order to understand the phenomenon of interest.

That human activity is invariably complex is readily admitted but it should be noted that even in the harder sciences it is not possible to know all of the initial conditions. There is a difference here but it is essentially a difference in degree. It doesn't follow that the D-N model should be rejected because it is difficult to know the minor premisses in the D-N model. As a counterargument to this position some people have pointed to Cronbach and Snow's (1977) discussion of ATI problems as support for the view that is is impossible to adequately appreciate the role of individual differences in explaining behavior. It is argued that individual behavior emerges from the meanings that an individual attaches to a whole setting rather than as being passively influenced by the external environment. It is argued that these meanings are private and essentially inaccessible to a researcher. Though Cronbach and Snow were trying to emphasize the inherent difficulties in conducting educational research in the D-N mode, people arguing from the "meanings" perspective suing the same examples are saying that the D-N model is fundamentally inappropriate given the inaccessibility of the minor premisses.

There are some inherent difficulties with this perspective because arguments for the primacy of private meanings has been philosophically unacceptable to many people. For the most part, a special status for private meanings has simply been denied. In this argument it is denied that meanings could be confined to one person and be significant even for that person just as Wittenstein argued that it was nonsensical to suggest that a private language could be significant. Meanings are necessarily public matters it is argues just as Wittenstein has argued for languages. Winch (1961), in a closely related issue, has argued in the Idea of a Social Science and its Relation to Philosophy that there are no private rules of behavior and so there cannot be actions that are meaningful solely to the agent involved.

Many human scientists who do not deny the importance of meanings in human agency but do believe that human behavior can be understood have supported an approach known as verstehen in trying to more completely explain human behavior. In carrying out the operation of verstehen, that which is to be explained is not necessarily related to general laws, though it may be at some point, but one does seek understandings of a situation as the involved actors see it. Through verstehen we see what the actors assess as significant and why they make those assessments.

In any discussion of a fundamental issue such as the explaining of human behavior it is important that fact statements and value statements be distinguished carefully. However, this is frequently a difficult thing to do. For instance, in many of the arguments opposing the D-N model of explanation, the issues of prediction and control figure prominently. At times prediction and control seem to be "red herring" issues that are closer to personal value statements than telling arguments against the D-N model. The specter of a human being controlled and made perfectly predictable is repugnant but that shouldn't be the point of these discussions.

The deductive model provides a basis for prediction. Logically, a prediction obtains largely by virtue of relationships among statements as statements and not by relationships in the content of those statements. In any case, predicting does not enmesh agents in power-based transactions for it is a formal matter in its fundamentals.

Consider also that in human affairs the level of process knowledge available for prediction and control even in the service of honorable pragmatic interests is simply not there. We must muddle through being satisfied with imperfect knowledge and have as our goal less imperfect knowledge: Predictions in the human sciences do not have the force of predictions in the physical sciences not because the deductive model is inappropriate but because, as Mackie so aptly described them, we have "gappy" laws to work with at best and our initial conditions are incompletely specified. That doesn't make the deductive model inappropriate, however.

The deductive model seems to be attached to an ideal state of complete knowledge. This ideal state is not only complete but also unchanging. If this is misleading, then the goal of scientific explanation by deduction from laws may more properly be one of finding explanations that are less imperfect. In considering this stance, which is more modest than most opponents of the D-N model would admit, no special status is claimed for the deductive model in terms of prestige. It is the model that figures prominently in the physical sciences, but its status is not obtained from that fact.

The imperfection of laws of human science (potential major premisses for the D-N model) is also used as an argument in opposing the D-N model. The controls required for a telling experiment are either not available or they are so constraining as to make the setting for the experiment too artificial for practical significance. There is no question that the testing of regularities in the human sciences is difficult but it would seem to be a matter of degree in comparing that to the rigorous experimentation that can be done in the physical sciences. These inherent difficulties do not support the rejection of the D-N model as being inappropriate. Of course, a person can always choose to reject explanation in the deductive model. The deductive model and the explanations that accrue thereto can be rejected but doing so doesn't make the D-N model inappropriate. Other versions of events and

relationships, e.g. through artistic or literary means, may complement the deductive model of explanation but they do not replace it.

The major premises in the laws of the D-N model also figure in other arguments opposing the D-N model because the major premisses are generalities. As such they are thought to be inappropriate in the human sciences for a couple of reasons: (1) generalizations in the human science must necessarily be about small numbers of individuals, and, (2) the deductive model ignores the possibly significant importance of a single person or event. Some of this argument is specious but there is another part that does point to a weakness in the D-N model.

There is nothing in the D-N model that requires that laws apply to all of humankind. Such laws may be context-bound, at times applicable only to a small subpopulation, and open to future revisions, but that doesn't invalidate them. In general, there is no need for large numbers in making valid generalizations.

The D-N model would seem to be inappropriate in efforts to understand a significant act that is unique and not likely to happen again. Such singular events, of course, are always set in the larger course of human events, but there is a sense in which we might like to understand these singular events as particular events. An example that comes to mind is the confluence of events, political and educational, that led to the "new math" movement. There is a sense of description that is needed here to explain these events. This description is to answer the question, "Wherefore?" We must be able to describe events before we can relate them to anything else in our experience. In this use a conceptual explanation is not deductive but neither does it refute the deductive model. It is simply a different sort of explanation. As a final note, one should be very careful about making clear cut distinctions in this discussion for as Wilson has noted (1985, p. 259) 'intelligibility' is fundamentally scientific intelligibility, intelligibility in terms of laws.

There is one other significant feature of the D-N model that should be noted before we move on to other issues. The D-N model does not provide guidance in choosing among differing views of reality that ultimately produce different laws. As an example, a Critical Theorist would provide vastly different explanations of a teacher's work role from those provided by a person committed to the view of teaching as a profession. The D-N model provides causal explanations but they are provided in a particular context. That there may be alternate explanation models is not revealed in the use of the D-N model.

OTHER MODELS OF EXPLANATION

Up to this point the discussion of the D-N model has entailed a commitment to a realist view of empirical theories. That is, true empirical theories explain an objective reality. that is a cosmology that is familiar to us and represents the so-called mainstream of research in the human sciences.

The human sciences now are being asked to consider alternate cosmologies. We hear of the Gaia Hypothesis, Chaos, Structure Determinism, and other versions of the universe, and we are asked to re-view our world in these cosmologies. This is a daunting prospect to

many people as is any revolution. We may feel that the solid ground that we have been standing on, however illusionary, has suddenly turned to quicksand.

It may be informative to begin with a view of human behavior which is somewhat familiar but nonetheless quite profound in its implications. This is the version of the universe which proposes that human learning is a part of a more general network of evolutionary processes. A most significant consequence of such a view is that learning becomes indeterminate and unpredictable. From there it would seem that the D-N model of explanation is inappropriate since there are no general laws available that relate to human learning.

In reflecting on this challenge to the D-N model, the general feature of the evolutionary process will be accepted. Some of these features are far from being universally accepted but that will not be the point of this discussion. Returning to the D-N model, it is a mistake to think that it presumes the use of laws that are timeless in a system that is closed. If that were the only setting for the use of the D-N model then it would indeed be inappropriate for any process that was evolutionary. Going on to learning as evolutionary with random processes involved, we should not lose sight of the fact that evolutionary processes are nonetheless historical processes. Human learning is not a willy-nilly business proceeding from here to there in some random fashion. Historical processes make for imperfect laws but neither historical uniqueness nor historicity preclude some lawfulness in explaining learning.

Explaining evolutionary processes has been a controversial issue for years and continues to be so. Goudge (1961) proposed "narrative explanations" as a way to explain evolutionary processes. These explanations were not in the D-N mode in his view but they were necessary and were useful. In brief, a narrative explanation begins in explaining X by referring to X because of Y. However, because of the exigencies of evolution, the explanation might well be viewed as highly improbable. In that event a narrative explanation which includes some hypothetical elements is offered to prevent the unwarranted rejection of the "X because of Y" explanation just because of its improbability. The narrative explanation is offered not to link the explained and explaining events in some simple way through a general statement but rather the events are linked by way of some story which includes intervening events or boundary conditions or such. In this use of narrative explanations the aim is to make the original explanation more intelligible but it is an intelligibility in terms of laws, nonetheless. Wilson, (1985, p. 295) in commenting on Goudge's proposed narrative explanations has gone even further to state:

> A narrative explanation, one which renders "E because s" plausible by suggesting certain intermediate steps could possibly account for that change (sic), has the merit of embodying a set of detailed suggestions about how the gappy explanation "E because s" could be improved. A narrative explanation contains a set of detailed hypothesis which, if subsequent research verties them, will provide a less imperfect explanation of E.

In explaining learning as an evolutionary process there are some distinct difficulties in the use of the D-N model but the use of this model is not totally inappropriate.

In discussing other alternate cosmologies, it may be useful to consider the nature of teleological explanations by focussing on the subcategory of functional explanations. Wright (1976) had defined a functional explanation as:

The function of X is Z if and only if:

(i) Z is a consequence (result) of X's being there,

(ii) X is there because it does (results in) Z.

If we use chaos and one of its functions in making the learning rate for a particular individual non-linear as an example then in more formal notation using the definition of functional explanations given above we may write:

The function of chaos is to make person X's learning rate non-linear if and only if:

(i) Person X's learning rate is non-linear as a consequence of chaos,

(ii) Chaos is present because person X's learning rate is non-linear.

The agenda that is laid out in this model of explanation may be disconcerting initially because it appears to explain something that is or has happened by reference to what will happen in the future, e.g. person X's non-linear rate in the future "explains" a function of chaos presently. However, such a superficial view is misleading because the proposition under (i) above, "Person X's learning rate is non-linear as a consequence of chaos," guides us to a cause-like deduction, i.e. the D-N model would be appropriate here. Specifically, it would appear that other causative factors would need to be ruled out in accounting for person X's non-linear learning rate. In retrospect, reasoning of this sort was present in the original "discovery" of chaos in dynamic systems.

It is important to note in this example that the presence of person X's non-linear learning rate was not sufficient to allow us to claim that it was a consequence of chaos. Could the non-linear learning rate not be accounted for by the vagaries of everyday events and influences? We need to be able to answer this question negatively as a crucial part of the teleological explanation.

In Aristotelian terms, the teleological explanation provides the final cause while the explanation for the proposition in (i) provides the efficient cause. Some such means and ends analysis seems necessary for explanations that are based in alternate cosmologies.

The use of a teleological explanation in the example of chaos is still of dubious value to many because it is not an explanation from a physical cause. Such metaphysical materialists would rather see the appeal to a real cause. As an example, metaphysical materialists would probably be more comfortable with explanations that might relate the non-linear learning rate to the presence or absence of certain neurotransmitters in the brain. This would be a more familiar and comfortable line of reasoning for the metaphysical materialists. As a speculative aside, the metaphysical materialists could be in a paradoxical box at this point. On the one hand they have seemingly brought the explanation back to physical causes but they may have brought us to a setting where chaos is even more significant, for at the

scale level of molecular psychobiology it is difficult to believe that chaos wouldn't be significant.

As a final comment, we have seen that the D-N model of explanation is not totally incompatible with teleological explanations of the functional kind. What's more this compatibility doesn't require that we commit to a metaphysical materialist position. the D-N model complements and is a part of these teleological explanations.

There is another variety of teleological explanation that seems of relevance in considering views of human behavior that posit a central place for consciousness and free will. The place of human free will has always been an issue in philosophy but with increasing evidence that human behavior is dictated in many cases by the presence or absence of specific chemicals in the brain the place of consciousness and free will likely become an even hotter issue in philosophy and psychology in the near future. That is not the issue here for it will be assumed for our purposes that free will is of fundamental importance in human affairs. If that be the case then the purposive subcategory of teleological explanations is relevant for this discussion. Wright (1976) has defined proposive explanations as follows:

S does B for the sake of G if and only if:

(i) B tends to bring about G.

(ii) B occurs because (i.e. is brought about by the fact that) it tends to bring about G.

As a simple example of this type of explanation, it could be said that a rat runs through a maze in order to find food. As with all teleological explanations, many people would not accept this explanation because it seems to imply that some consequence is the cause of some antecedent event. Of course, these objections lose much of their force if beliefs and intentions are allowed as causes of actions. Admittedly, in the rat example, even rats have to be allowed something like beliefs and intentions in order for this explanation to work.

It would be instructive to try the purposive explanation on a human activity which might be described as exercising free will.

Person X does not (Act Y) for the sake of (proving Person Z's prediction wrong) if and only if:

(i) (Act Y) tends to bring about (proving Person Z's prediction wrong.)

(ii) (Act Y) is brought about by the fact that is tends to bring about (proving Person Z's prediction wrong.)

Considering the statements in (i) and (ii) as true then the conditions for asserting the purposive explanation are fulfilled and we have an explanation for Person X doing Act Y. At this point in the example a couple of notes should be made. First, Person X has become aware of Person Z's prediction in some way. This is a part of the initial conditions surrounding Act Y, at which point the purposive teleological explanation applies. Secondly, if

Person X had not been made aware of Person Z's predictions then, presuming Person Z had sufficient skills and knowledge, Person Z would have been able to predict Person X's behavior and the D-N model of explanations would have applied. In summary, the D-N model would not have applied equally whether or not Person X previously knew of Person Z's predictions. Metaphysical materialists could still object to the admittance of beliefs and intentions as being in any way causative in human behavior. This contentious issue is not resolved and likely won't be for some time if ever. However, that doesn't matter because in the human sciences we can profitably use the purposive explanation as-if it was applicable.

The purposive teleological explanation is not of the classical D-N model. However, that doesn't mean that the D-N model is completely inappropriate in these events. It is possible to recast the example used previously in something like a D-N form though with less force of necessity than is present in the classical D-N model. If we take beliefs and desires as fundamental causes of intentions then we can explain actions using a D-N model with teleological premisses:

Teleological D-N:

> A Known prediction can be invalidated by doing an act that is not included in the prediction.
>
> Person X wishes to invalidate Person Z's known prediction.
>
> Therefore, Person X does Act Y which is not included in the known prediction.

Though this explanation has the form of the D-N model it is plain that this explanation does not have the firm deductive link between the premisses and the conclusion because intention does not necessitate action as would be the case in classical D-N explanations. Nonetheless, the D-N model of explanation is not totally inappropriate in coming to understand human behavior of this sort.

FINAL COMMENTS

The D-N model of explanation is the source of valid prediction and control when we have an appropriate level of process knowledge about events in question. Of that there is no question. Of concern in this paper is the philosophical stance that equates the D-N model of explanation with prediction and control in a timeless and unchanging way.

Arguments that are presented to claim that a deductive model of explanation is inappropriate in a specific situation often seem to confuse this claim with the distinction that can be made between explanations that are better or worse because they are less or more imperfect.

In conjunction with arguments purporting to show the inappropriateness of the D-N model in certain human affairs, intuitively explanatory examples are offered which are to make the case for alternate modes of explanation. Admittedly, these alternatives may be of value in an intuitively satisfying way but they are lacking because they are not <u>conclusive</u>. They are not conclusive because no criteria is available by which to justify our intuitions.

Notwithdstanding the deficiencies of these alternate explanations in their being conclusive they are not a telling argument in opposition to the D-N model. One can accept the alternate explanation without rejecting the D-N model.

Arguments to the effect that the D-N model of explanation should be discarded in favor of some model of explanation that doesn't necessitate prediction and control have been shown to be in error. Explanations in the human sciences seldom are of the determinate kind that permit rigorous prediction and control. Explanation in the human sciences making use of the D-N model are at best determinable rather than determinate aiming to go from imperfect laws to less imperfect laws. We are not nor should we be aiming to apply perfect laws to our interests in the human sciences. However, that doesn't mean that we need to abandon the D-N model of explanations.

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